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ABSTRACT

The view that computers are crucial tools in current educational technology raises questions concerning their importance for prospective teachers and invites concern about how preservice teachers might react to interacting with both computers and children in an educational setting. Preservice language arts teachers with little computer experience were paired randomly with 30 fourth grade and 29 fifth grade children to form pen pal pairs. They exchanged letters via floppy disks carried back and forth between the college and the elementary school. Each pen pal pair completed six exchanges over four months. Findings indicated that the elementary school students gained writing and punctuation skills by modeling on the college students' letters, and that many pen pal pairs developed close, open relationships. Also, the majority of the preservice teachers expressed positive feelings about the project. Major benefits involved learning to use the computer and word processing software and developing a close relationship with an elementary school student. Major concerns and criticisms arose from technical problems, such as scheduling the use of the single available computer and having two college students share one elementary students pen pal. Most prospective teachers recommended that the project be continued and that it be extended with more exchanges and more computer training. (Author/SKC)

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RESPONSES OF PROSPECTIVE
LANGUAGE ARTS TEACHERS TO AN
ELECTRONIC LETTER WRITING PROJECT

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Abstract

The view that computers are the "educational technology of the eighties" raises questions concerning their import for prospective teachers and, more specifically, how prospective teachers might react to them in a situation where they were required to interact both with children and computers in an educational setting. Prospective teachers (N = 35) who participated in this project had not been exposed to much computer technology in a school context. These preservice teachers were randomly paired with fourth graders (N = 30) and fifth graders (N = 29) to form pen pal pairs. Letters were exchanged via floppy disks carried back and forth between the university and the elementary school involved in the study. There were six complete exchanges for each pen pal during the course of the project (November, 1984 to March, 1985). The majority of the preservice teachers expressed positive feelings about the project. Major benefits which accrued from the experience had to do with learning how to use the Apple IIe computer and Bank Street Writer (BSW), and the development of a close relationship with an elementary school student. Major concerns and criticisms had to do with technical problems associated with scheduling time for the one computer available for use and with having to "share" a student with another preservice teacher. Most felt that the project should be continued over an extended period of time (more exchanges) and with more training sessions offered over the term of the project.

Introduction

Olds (1985) claims that the advent of computers into classrooms will make a major difference in how instruction is offered in our schools. Computers are indeed the "educational technology of the eighties" (Riel, 1984). The question is how they will be used and, more importantly, how they will be received by classroom teachers.

Society, as Bruner (1986) puts it, provides a tool kit of concepts, ideas and theories that permit one to get to higher ground mentally. At the heart of this view is Vygotsky's (1962) notion of the "zone of proximal development". Essentially, it is Vygotsky's views which represent a description of how the more competent assist the young and less competent to reach that higher ground. The zone of proximal development is the distance between the actual developmental level as determined through independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978).

An important aspect in assisting the young in this process is the enthusiasm and effort generated by the classroom teacher. In addition, it is this collaborative learning between teacher and student which should be an enriching experience for both the student and the teacher.

It is within the theoretical context provided by Vygotsky that we attempted to gather insights into the views of prospective elementary teachers as they interacted with students at an elementary school through the means of electronic letter writing. The exchange of letters between students in a senior language arts methods course and children in grades four and five proved to be a rewarding opportunity for cross-age interaction. A high level of interest and excitement was generated, both

from the university students and from the elementary children, but this report will focus only on those aspects of the program that dealt with the preservice teachers.

The prospective teachers (students in a fourth year language arts methods course) who participated in the project had not been exposed to much computer technology in a school context. It was hoped that providing an opportunity to experience an electronic communication system would illustrate one use of computer technology for these prospective teachers, since they will undoubtedly have to use such technology in their future jobs.

Goals

The goals of the project were as follows:

1. To develop communication skills through the use of word processing software.
2. To develop competency in using a computer as a writing tool and to expand the participants' perceptions of appropriate uses of computers.
3. To provide prospective elementary school teachers with the opportunity for direct communication with elementary school students.
4. To give prospective elementary school teachers the opportunity to examine children's writing over an extended period.
5. To test the feasibility of electronic communication between schools and the Faculty of Education for future inclusion in other courses or in the teacher preparation program.

Procedures

The preservice teachers (N = 35) were randomly paired with fourth graders (N = 30) and fifth graders (N = 29) to form the pen pal pairs. In

order to provide each preservice teacher with exposure to both a fourth grader and a fifth grader, some preservice teachers "shared" a pen pal. Thus, each preservice teacher had responsibility either for two individual pen pals or for one individual pen pal and one shared pen pal. Floppy disks containing the letters were carried back and forth weekly between the two sites. Recipients were responsible for printing out their letters.

There were six complete exchanges for each pen pal pair during the course of the project (November 1984 to March 1985). One-half of the students in each elementary school class were involved in letter writing each week; the preservice teachers wrote letters as required to maintain this schedule.

Instruction on BSW was provided to the preservice teachers in a workshop-like setting. Instruction was given to the group as a whole with time then set aside for practice of the BSW functions in one of the computer labs available at the university. This instruction took about three hours. Almost half of these students were simultaneously enrolled in a computer literacy course which included work with BSW.

During the first week of classes, the preservice teachers were invited to take part in the project both as pen pal correspondents with the elementary school students and as involved participants in a research project. Members of the research team explained the project to the students and a handout was distributed offering further information. A consent form was appended and all students in the class ($N = 35$) agreed to participate. Essentially, participation in the program entailed the following conditions:

1. Each student would learn to use an Apple IIe computer with disk drives and printer.

2. Each student would learn to use the word processing package Bank Street Writer, (BSW).
3. Each university student would keep a journal assessing the child's communication skills and reflecting on the process of electronic mail communication.
4. Each university student would 'print out' copies of letters and drafts of the letters and file the copies in a central location. Letters were accessible to the researchers for examination.
5. Each university student would complete a questionnaire and have an interview with the instructor at the end of the project.

The letters written by both the children and the preservice teachers were used in class discussions of methods for teaching language arts. Typically, the letters were used to clarify basic issues or problems associated with the use of the BSW and to comment, in a general way, about the style of writing evident in the children's writing. Since this was an initial project, the major emphasis was to have students reflect on what they did and observed rather than engage in teaching activities which arose out of class discussion. In other words, this study was not, and should not, be viewed as a training study.

Preservice Teachers Reflections

The majority of the students expressed positive feelings about the project. Most of them stated that one of the major benefits of a project of this kind was that they learned how to use a computer and to "feel comfortable" in using BSW. One student reported that, as a result of the project, she was now a "confident user of a word processor" and now prefers it to her typewriter. Following the end of the term, this same student

enrolled in two computer in-service courses which were offered in the spring term.

In the interviews, all students expressed feelings of amazement at how quickly a relationship could develop in such a brief exchange of letters (six letters were exchanged). In fact, the majority of students used the word 'enjoyment' predominantly in talking about meeting the students and writing to them. Other personal reactions to the project had to do with the benefits that the children received in that "using adults gives the students better writing models" and that the project was useful because it "increased awareness in ourselves and in students."

Concerns About Technical Aspects

This was an area of great variability in that the university students exhibited varying levels of competence in their facility with computers and familiarity with BSW. One student, for example, had taken a computer course the previous year and had a computer at home. She found the computer easy to use and her only problem was scheduling time to write letters to a child who was being shared with another university student.

A related concern had to do with scheduling time, particularly when two university students shared one student. Indeed, this proved to be a major source of aggravation. Other students complained about problems involved in finding time to work at the word processor. The Apple IIe was located in a secure room isolated from regular classrooms and a "sign-up" sheet was posted. We, too, were concerned about this until we discovered that the reason for the line-up of students on Tuesdays and Thursdays was because most students had classes on these days and did not want to come to the university on days when they had no classes. The fact, too, that we

had only one computer was criticized by a number of students. However, it should be pointed out that other computers (and BSW) were available upon request. In other words, computers were available if required.

The preservice teachers tended to write their letters out on paper first, though they were not obliged to do so. All their computer time was scheduled as an outside-of-class activity, and due to the regular availability of only one machine, their approach may have been inadvertently encouraged by the need to make efficient use of limited machine time.

Other concerns which surfaced had to do with the initial period of instruction offered as part of the project. A number of students felt that these inservice sessions should have been shorter and more frequent, and that review lessons should have been undertaken at the mid-point in the project. However, despite the problems which arose for the preservice teachers at the outset, these proved to be largely of a technical nature and by the time they had written their final draft, most of them felt that they had overcome "a great hurdle" and that computers had become "a wonderful tool to write with."

Basically, it would appear that training sessions served the novice preservice teachers poorly. Facility in using BSW was achieved primarily on a trial and error basis, or when one of the more proficient students was available for consultation. Indeed, this initial process of attempting to achieve mastery must have been a difficult task. One student, who claimed to be a one finger typist, claimed that it took over one hour to type the first letter. Improvement in typing speed was one benefit that was noted by this student. Another student reported that in her first letter she forgot to load BSW and, as a result, she indented her entire letter to her

pen pal. This same student also reported that she was unable to figure out how to correct a mistake within the text. Her initial strategy was to backspace and erase everything past the mistake. However, by the time she was on her last exchange, she had learned how to edit her text more efficiently.

Others, of course, gained control of the mechanics of word processing more readily. As one student reported, "by mid-January I could write and print a letter with speed and proficiency." This seems to have been the experience of the majority of preservice teachers. It appears that once the students had overcome their fear of things mechanical, and once they had gained some proficiency in editing using BSW, then the process of letter writing achieved its essential purpose, that of real communication with another person.

Concerns About Sharing A Student

At the outset of the project, we felt that having two preservice teachers share a student would be positive experience for them. However, there were problems inherent in, first, pairing preservice teachers, and, second, writing to that student. In the first instance, pairing university students on a random basis turned out to be an unsatisfactory arrangement. In other words, there was a definite mismatch in the personalities of some of the pairs. Secondly, shared responsibility for one child led to a number of difficulties. The university students often found it inconvenient to meet and complete the letters together, particularly if they wanted to complete the letters on-line. Some pairs simply alternated in the writing of letters, but this left the child responding to one person and getting the next answer from someone else, so

that there was continual disjointedness. When two university students composed together but expressed a personal interest or opinion that was pertinent to only one of them, they could not write, "I like..." since with a joint signature that child would not know who was speaking. In the end they resorted to using the third person (Beth likes downhill skiing, but Brenda prefers cross-country.). In the context of a personal letter, this form of self-referral was awkward and made the writers seem rather remote. While the children seemed to cope well with addressing two pen pals jointly, the university students consistently reported a strong preference for having sole responsibility to write to a child.

Reflections on the Letters

Reflecting, it would appear, is an aptitude which develops slowly and unevenly in individuals. In this regard, university students are no exception as is apparent in an analysis of their journals and in interview protocols. Generally, however, some aspects of the children's writing did strike the university students as being noteworthy. A number of them commented that the children picked up on elements of writing that were used in the letters written to them. This modeling of phrases is illustrated in a number of extracts. The first is between a grade 5 girl and a male adult. (All extracts are copied verbatim. "A" means "adult", and "C" means "child"; "--" means that text was omitted.)

A: I was very happy to receive your letter as it gave me a chance to get to know you a little bit. Thank you! I'm sure we'll both get to know more about each other as we go along. That's good! Because of my name, you might have been wondering whether I am a man or a woman. Can you guess which one? Well, I'm the only one in my class with a moustache, so I guess I must be a man. -- I'll be looking forward to hearing from you again.

C: I just couldn't wait to get your letter because I was hoping you'd tell me if you were a man or woman. I hope you're not wondering if I'm

a girl or a boy, are you? Well, I'm the only one in my class with long hair that's down to my seat so I guess I'm a girl.

A: It was great to get your letter. I especially liked the part about your long hair. As long as you don't have a moustache as well, then you must be a girl. -- I'll be looking forward to hearing from you. These letters are fun!

C: I WAS GLAD TO GET YOUR LETTER. -- I'LL BE LOOKING FORWARD TO HEARING FROM YOU. -- YEP THESE LETTERS ARE FUN.¹

A: I'll be looking forward to hearing from you again. I always enjoy your letter.

The second extract is also from a grade 5 girl.

A: Hi! Thank you very much for the nice letter. -- Well, I think I've asked you enough questions for now. I will be looking forward to getting another letter from you.

C: HI! THANK YOU FOR THE LOVELY LETTER. -- WELL I GUESS THAT'S ENOUGH QUESTIONS.

A: I was very excited to get your letter, thank you very much. -- Well, I guess I'll answer some of your questions now. -- Well, have a very Merry Christmas Cindy, and a Happy New Year.

C: Hi! How are you? I was very glad to hear from you. -- I guess that's enough right now. I hope you had a Merry Christmas and the happiest New Year.

A: Hi, thank you very much for the nice letter. -- You asked me quite a few questions, Cindy, so I'll try to answer them now. -- I'll look forward to getting your next letter.

C: Hi Cindy! I was excited to get your letter.

A: Hi! I just want to tell you how excited I was to meet you in person. -- Well, I just want to say again how nice it was to meet you, Cindy, and I'll really be looking forward to your next letter. Have a nice week!

C: Hi! How are you? I enjoyed coming to the university. Yes, I liked (actually I loved going to the university. -- Well I have nothing left to say so I better be going now. GOODBY.

¹ The fact that some responses were in capitals indicates that some students' responses were written entirely in capital letters.

There are also numerous instances of copying the use of capital letters and pictures made out of characters on the keyboard. That is, if the university student used capital letters, the follow-up letter from the child would contain some capital letters (see the example listed above).

The next extract is from a grade 4 male.

C: On December 6/84 was a good day. How is it out there? Write soon.

A: On December 6/84 it was also a good day for me. I certainly enjoyed the mild weather. RIDDLE TIME: What is black and white and read all over?

A: RIDDLE TIME: Where do monsters get their mail: ANSWER: At the dead letter office. -- P.S. Cindy, please send me one of your riddles.

C: On the 22 of Feb. thats on Friday is my BIRTHDAY! I'll be 10. How old are you?

A: By the way, HAPPY BELATED BIRTHDAY! -- RIDDLE TIME: Why did the eagle fly over the mountain? Because it could not fly under it! Ha! Ha!

C: RIDDLE TIME Why did the turtle cross the road! because it wanted to get to the shell station. One more riddle! What kind of bars can you eat! Chocolate bars.

The copying tended to be either of conventions or of overall style (e.g., acknowledge question/answer question/ask follow-up question). As would be expected, the children did more copying than the adults.

The university students tended to focus primarily on this aspect of modeling and on length of letters received from the children. For them, length was equated with quality the assumption being that the longer the letter the greater the child's ability to produce a meaningful exchange. A typical feature of these exchanges was that both sides seemed to "run out" of things to say to each other. One child, for example, stated to the university pen pal, "You already know almost everything about me."

What was really surprising was that the university students seemed almost oblivious to the miscommunication that oftentimes occurred

throughout the exchanges. One example of a misunderstanding among pen pals resulted from a simple letter reversal error.

C: My hobbies are biking playing games and ECT

A: P.S. - What is ECT?

C: [no relevant response]

A: In you first letter you said that your hobbies included games and E.C.T. What kind of games do you like to play? What does E.C.T. stand for? Does it have something to do with computers?

C: ECT. stands for exetra. No ECT has nothing to do with the computers.

A: You told in your last letter that ECT stands for extra. Is that some kind of game? We're still not sure what it is.

C: I don't think E.C.T. has nothing to do with games.

This particular misunderstanding on the part of the two university students is somewhat surprising considering how commonly "etc." is misspelled as "ect." The intuitive interpretation that allows teachers, especially teachers of beginning writers, to read unconventionally-written text is apparently not yet well-developed in these two preservice teachers. But in this situation with games just mentioned and the word "and" used before "ect," the context did lead the university students toward the interpretation made. This particular confusion was minor and not a deterrent to the flow of the conversation and the exchange of ideas.

A more serious miscommunication had to do with the child and adult correspondent knowing the meaning of each other's words at a fairly literal level but failing completely to appreciate underlying meanings. An example occurred when a very young adult reported to a grade four boy the most interesting aspect of her Christmas vacation.

A: I got engaged to be married. My fiance's name is Bob and we will be married on June 29th of this year. I have been really busy trying to get all the plans arranged for the wedding and in keeping up with my school work.

- C: I am surprised that you are getting married.and this is special acation for me too because next week is my birthday.
- A: Why are you surprised that I'm getting married? Bob and I will be buying a house in Beddington, do you know where that is? We are very excited about our upcoming marriage and yes it is a very special occasion.
- C: Why are you getting married?Why are you moveing?
- A: You still sound surprised that I'm getting married. Bob and I have known each other for a very long time and we feel that it is time to start our own family.
- C: After you get married what are you going to do?What are you going to do in the future?
- A: You asked me what I will be doing after I get married and the answer is that I will be teaching.

The university student's enthusiasm contains in it an expectation that everyone will, of course, both understand and share her delight in the prospect of being married. This contrasts markedly and rather amusingly with the boy's failure to figure out both why she would want to be married and how marriage relates to what he seems to regard as more conventional aspects of living, such as jobs and moving. His equation of marriage with his birthday as two special events indicates clearly his lack of recognition that marriage makes a much more significant difference in a person's life than merely having a special cake. The child's inability to understand why the adult would get married and the adult's inability to understand the child's surprise both show how very divergent their perspectives are an how unsuccessful each has been at taking the other's point of view.

Nevertheless, a number of university students displayed remarkable sensitivity both in dealing with issues raised by the children and in inviting students into a meaningful dialogue. To illustrate, a grade 5 boy reported just before Christmas that he and his family were going to the

Rockies for Christmas "because my cousin has cancer and she is going to die." In the following letter he reported her death. The two adults tactfully and briefly offered their sympathy, including in their letter a paragraph which read:

We are sorry to hear about your cousin. We're sure that your visit at Christmas meant a lot to her. Hopefully it was nice for you to see her again also.

Since they had not met the boy and knew nothing about his extended family relationships, some carefully considered wording was needed. As he had been direct in telling them the problem, they also replied in fairly direct language which tried to be gentle but did not avoid the issue. The child's next letter began:

I thank you for feeling sorry for my cousin when she died. I think she would feel very happy if she heard you say that. My dog also died on January 22nd.

Perhaps the best example of how meaningful communication with a young child was developed is to be found in the journal entries and letters of one of the more mature students in the class. Although this university student devoted a fair amount of space in her entries to the mechanical aspects of letter writing, there are a number of comments which revealed a growing awareness of the need to adapt her letters in a manner which would promote greater interaction. The following entry, dated January 24, is an example of this growing awareness,

This has to do more with the writing side of the assignment, but as I was beginning to type I was telling...that Billy just answers my questions and does nothing with them...so I included three questions that he would really have to think about. (Journal entry).

The next journal entry, dated February 11, goes as follows,

I received probably the longest letter from him to date... He actually answered one of my questions in two sentences with a certain elaboration that I had not even thought of.

The March 4 entry expands on this student's earlier comments. The letters are now much longer. This letter provides further insights into the technique she employed in order to get Billy to put more into his letter. As she writes,

I think I finally found an issue that he wanted to talk about...his grandfather. His grandfather lives in B.C. and apparently the family goes to visit him every summer... I asked him to expand on what kinds of things he did in B.C.... He talked for a whole paragraph on all the things that went on there. (Journal entry).

The comments illustrate the awareness that this university student gained into the sorts of things one could do to develop a sustained exchange with her pen pal. Of course, there is more to developing an interesting and meaningful set of exchanges than asking open-ended questions and inquiring into the child's interest. From our analysis, we feel that these pen pal correspondences became more effective when the university students utilized the aforementioned procedures and when they were willing to share or disclose more of themselves to their pen pal. This is illustrated in the following exchange between this same student and her pen pal:

University of Calgary
Calgary, Alberta
January 29, 1985

Dear Billy:

Thank you for that very nice letter you sent me, telling me all about Christmas.

By the time you get this letter you will already have met me. I hope you really enjoyed your visit to the University. Did our little tour make you want to come and study here when you grow up? What things did you like best about your whole visit here?

I was sorry to hear about your Grandpa. I hope he is feeling better. Why don't you tell me all about him.

To answer your question about where I would like to teach, let me just say that I would teach wherever I could get a job. I have written letters to places in Manitoba and Saskatchewan and Alberta.

I grew up on a farm and I really loved it, Billy. I wish everybody could have that chance. When I was growing up we had chickens, horses, cows and pigs. We also had a dog and at one time had as many as seventeen cats! I had to go to school on the school bus and it usually took me one hour to get to school. The schools I went to were in town and they were probably a lot smaller than the one you go to. Our closest neighbor was about a mile from our farm so I would ride my bicycle there quite often.

If you lived on a farm what would you want it to be like? What sorts of things could you find to do on a farm?

Write soon.

Your friend,

Jean

Billy's reply indicates just how well the university student's letter has succeeded in "bridging the communication gap" which is often the case when two individuals are attempting to get to know each other more completely. The warmth, the openness, the self-disclosing nature of the university student's letter invites, as it were, a similar level of response in the child's letter which runs as follows,

Glenhill School
Calgary, Alberta
February.4/85

Dear Jean,

Thank you for your nice letter.

I really liked visiting the University the best thing I liked was the Science room. I don't know if I want to go to the University. Are you going to watch the figure skating, the speed skating and the Hockey?

My Grampa was a police man he retired in 1980 and now he lives in B.C. and he gulfs and I gulf too.

I would like the farm to have 4 dogs, 5 horses and 20 cows. I would like to feed the horses and cows and help my dad work on things.

What things do you do in the summer? What sports do you do in the summer? Why don't you tell me all about your farm?

a a

—/

your friend

Billy

There is, of course, a great deal more needed in the way of research on and analysis of the reactions of preservice teachers to writing and to exchanges of this kind. The difference in style evident between grade four and grade five students, which was noted by the university students, is an important area in terms of its pedagogical implications. What has been observed in the foregoing are some of the salient reflections of the university students concerning the project itself.

Discussion

This project represented an attempt to explore the effects of electronic letter writing on the communication skills of both elementary school students and preservice elementary school teachers. Implications for future instruction of elementary school teachers can be stated under the following headings:

Technical Aspects

1. Preservice teachers should have a background in the use of computers and computer software (particularly BSW) before undertaking a project of this nature. In other words, technical considerations should be overcome before the actual letter writing is undertaken.

2. Adequate access to computer facilities (i.e., computers and BSW programs and a modem) is essential in order to ensure that there is ample time and opportunity to develop exchanges with the students.
3. A project of this nature should be carried out over an extended period of time in order to allow for the development of communication between participants. Many exchanges with the children need to be built into the program.
4. Preservice teachers should not share a student. Rather, preservice teacher each student should be given the opportunity to develop communication with one student at each grade level. The idea of corresponding simultaneously with students at differing grade levels is, in our opinion, a useful experience in that it allows the prospective teacher to observe writing at two different levels of development.

Curriculum Implications

1. It might be advisable for curriculum and instruction departments to think seriously of developing a formal, academic course dealing exclusively with computer applications in the language arts. A course of this nature could have a laboratory component attached in which preservice teachers might be given the opportunity to utilize software with students in a variety of settings (teacher-student exchanges in the classroom, i.e. dialogue via the word processor; pen pal arrangements; teaching the writing process via BSW or other programs).
2. The content of curriculum and instruction course outlines needs to be revised in order to provide for the growing needs to utilize computer programs in the classroom.

Instructional Implications

1. Time needs to be allocated within the existing curriculum to deal with the instructional needs that arise as a result of exchanging letters. This area could be covered as part of the treatment of writing but would entail ongoing evaluation and discussion with preservice teachers.
2. Preservice teachers need to be made aware of the role that language development plays in communication (through letter writing). Knowing something about the role of conventions in letter writing, the need to disclose of oneself, and the need to ask open-ended questions are relevant factors one needs to take into account.
3. The impact of modeling has instructional implications in that it may lend itself to some actual experimenting on the part of preservice teachers.

Conclusions

There are several limitations that restrict the range of applicability of the conclusions. First, the number of exchanges of letters was small. The late arrival of the equipment and the Christmas holiday limited the number of exchanges between the two groups. Hand-carrying the disks between sites increased the exchange time and correspondingly decreased the number of exchanges. Second, the limited computer time resulted in less facility in using Bank Street Writer than had been hoped. Some mistakes (e.g., spelling, format) may have been due to lack of technical skill rather than lack of actual knowledge. Third, a few letters were lost, despite concerted efforts to prevent this.

The prospective teachers did little editing. Much more attention to identifying appropriate editing skills and discussing ways of teaching those skills seems called for in future projects.

Related to this is the problem that in BSW what appears on the monitor screen is not what appears on paper since the monitor screen is limited to fewer than 40 characters. The early letters of the elementary school students especially illustrate this problem; the RETURN key was consistently misused or ignored. However, over the course of the letter-writing, there appeared to be considerable improvement in formatting. A different word processor which showed a screen display of what would appear on paper would likely go a long way in eliminating the problem altogether.

There also appeared to be only limited creativity displayed by the writers. The use of the "friendly letter" schema may not have been the best for encouraging development of imaginations. Too, since there were only six exchanges of letters, there may not have been enough time to get beyond the simple conversational conventions of politeness in turn taking. More exchanges, especially after the face-to-face meeting, might have supported more creativity. Within the constraints of the project, however, there were several instances of sharing of personal concerns, which in turn would seem to be helpful in developing communication skills.

Learning BSW and writing letters seemed to have cut into the content covered in class. As more students come into language arts class with word processing skills, this problem may diminish. If word processing continues to be viewed as an "add-on" to the language arts curriculum, however, this view should not be unexpected. A more fundamental question seems to be raised; namely, how should be language arts content change to reflect new

technologies available in the world. As with all other content areas, language arts is certain to change in response to the availability of computer software, e.g., word processing, spelling checkers, grammar checkers, etc. Identifying the changes to make will take time, but it is important that some serious reflection and action be undertaken as quickly as possible.

The use of BSW seemed to provide a supportive environment for communication between pen pal pairs. It has often been recognized that use of word processors allows people to write more. In the context of exchange of letters such support seems virtually essential if true communication and sharing of information is to take place. As was noted earlier in the analysis of the letters, however, sometimes the information communicated was not actually received by the pen pal. Further attention needs to be given to assisting communication at a level appropriate for the pen pal.

The use of modems to communicate the letters, rather than the "pony express" system used, might significantly enhance the perceptions of the pen pals about possible uses of computer technologies. Expectations of delivery of replies would almost certainly have changed, possibly toward faster turn-around. In turn, this might have increased personal frustration if turn-around was not as rapid as desired.

Some comments seem in order about the age difference between pen pals. There was obvious confusion among the elementary school students about the concerns of their pen pals; this was reflected in inconsistencies in topics discussed across letters. The problems with the "marriage schema" illustrate these inconsistencies. However, the dissonance seemed creative for both groups. It may have helped the children in their process of decentering, and it seemed to provide a deeper insight on the part of the preservice teachers into the thinking of children.

The project seemed to be successful at generating enthusiasm among the preservice teachers. This enthusiasm in turn seemed to have cognitive consequences for both the teachers and the children.

First, the preservice teachers clearly made successful efforts to involve the children in the project. The use of questions and encouragements in the letters to the children are indicative of these efforts. Projects in which so much individual attention is focused on children seem almost to guarantee success, so the enthusiasm among the pen pals is not surprising.

Second, the preservice teachers were generally quite involved with their pen pals. This may have resulted from the motivation inherent in the use of computers, from the unusualness of the pen pal contacts, or from the attention focused on the project through class discussions in the advanced language arts methods course. This involvement undoubtedly increased the perceived importance of the project activities.

Third, both the efforts to involve the children and the personal involvement with the children seemed to be important precursors of the enthusiasm that the preservice teachers had for the project. Because of the ego investment of the teachers in the activities, because of the public comparisons of letter-writing skills that resulted from class discussions in the methods course, and because of the obvious enthusiasm of the course instructor for the project, the preservice teachers became quite enthusiastic about the activities as a means for improving their understanding of children's writing skills.

Fourth, the adult/child contacts and the shared enthusiasm seemed to result in increased understanding of, and sensitivity to, writing process. Exposure to actual writing samples of children was an important supplement

to the regular discussion of the teaching of writing. The samples also provided a context for the development of insight about how children think and process information. Conversely, it is likely that the children's understandings were also altered by their contacts with adults, but there were no data gathered on this point.

The project represents one successful means of generating enthusiasm among preservice teachers about teaching writing. It is certainly not the only way, but it is one that seems relatively easy to replicate in other environments. Hopefully, this report will serve to encourage other teachers to try these techniques.

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